

### **REMARKS**

The Office Action mailed December 29, 2004 has been reviewed and the comments of the Patent and Trademark Office have been considered. Applicant respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

#### **Status of Claims**

Claims 1-40 were pending in the application. Claims 1, 16, 20, 35, 39, and 40 have been amended and no claims have been canceled or newly added. Therefore, Claims 1-40 are pending in the application and are presented for reconsideration. Please note that claims 16 and 35 have only been amended to correct typographical errors.

This amendment changes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

Applicant sincerely thanks the examiner for indicating that claims 1-39 contain allowable subject matter.

#### **Claim Objections**

Claims 1-40 are objected to because of the informalities as indicated in paragraph 1 of the office action. Applicant has amended the claims to address the first four bullet points in the paragraph.

With respect to the fifth bullet point, applicant notes that "the d-axis" means a direction along the center axis of a magnetic pole of the rotor. The term "d-axis" is well known in this technical field as described, for example, in column 1, lines 17-22 of the cited Iijima reference. In addition, "q-axis" means a direction perpendicular to the "d-axis".

With respect to the eighth bullet point, applicant notes that " $\alpha / \beta$ -axis" means the stationary reference axis fixed to a stator. The term " $\alpha / \beta$ -axis" is well known in this technical field as described, for example, in column 1, lines 17-22 of the cited Iijima reference. The term " $\alpha / \beta$ -axis" is used to denote a space vector in a fixed coordinate system. For example, in a three-phase motor, generally, the U-axis, which is a center axis of

a U-phase winding of U,V,W-phases, is the " $\alpha$ -axis", and the " $\beta$ -axis" is perpendicular to " $\alpha$ -axis".

In claims 7 and 28 (with respect to the sixth bullet point), applicant clarifies that "an angular speed  $\omega$ " (lines 6-7, line 5, respectively) is different from "an angular speed" recited on lines 4 and 3.

In claims 14 and 33 (with respect to the seventh bullet point), applicant clarifies that the product is meant to be a regular multiplication.

### **§ 102 Rejection**

In the Office Action, claim 40 is rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,583,593 ("Iijima"). Applicant respectfully traverses this rejection for at least the following reasons.

Iijima shows a method for position-sensorless motor control wherein a rotor-position estimation current signal is superimposed on the  $\gamma$ -axis direction component of a target current vector representing target currents of stator windings. In this method, the rotor-position estimation current signal  $\gamma_{irs}$  having a different frequency is superimposed on a current vector component in an estimation position direction, and then a position estimation error  $\Delta\theta$  is obtained based on an amplitude of the superimposed wave component  $i_{\delta s}$  of the  $\delta$ -axis current  $i_{\delta}$ . That is, based on the fact that if the position estimation error  $\Delta\theta$  is zero, then the amplitude of the superimposed wave component  $i_{\delta s}$  becomes zero, the phase angle of the motor is estimated by adjusting estimation position so that the amplitude of the superimposed wave component  $i_{\delta s}$  becomes zero as described in column 33, lines 15 to 26, column 36, lines 28 to 40 and Fig. 8 of Iijima. Consequently, Iijima fails to disclose the subject matter recited in claim 40 which requires that the phase angle of the motor is detected based on a target value of a feature (calculated based on at least one of the length of a long axis and the length of a short axis of a current vector locus) and an actual value (calculated based on at least one of the length of a long axis and the length of a short axis of a superimposed current vector locus).

In other words, Iijima discloses that the phase angle of the motor is detected based on the amplitude of the superimposed wave component  $i_{\delta s}$ . In sharp contrast, claim 40 requires

that the the phase angle of the motor is detected based on at least one of the length of a long axis and the length of a short axis of a current vector locus. Since this recited feature is not disclosed or suggested by Iijima, claim 40 is patentable over Iijima.

### **Conclusion**

In view of the above and based on the indications in the office action, applicant believes that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested. The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

Should additional fees be necessary in connection with the filing of this paper, or if a petition for extension of time is required for timely acceptance of same, the Commissioner is hereby authorized to charge deposit account No. 19-0741 for any such fees; and applicant hereby petitions for any needed extension of time.

Respectfully submitted,

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FOLEY & LARDNER LLP

Customer Number: 22428

Telephone: (202) 672-5485

Facsimile: (202) 672-5399

By Aaron C. Chatterjee

Glenn Law

Registration No. 34,371

Aaron C. Chatterjee

Registration No. 41,398

Attorneys for Applicant